



Safety-Aware Cyber-Molecular Systems

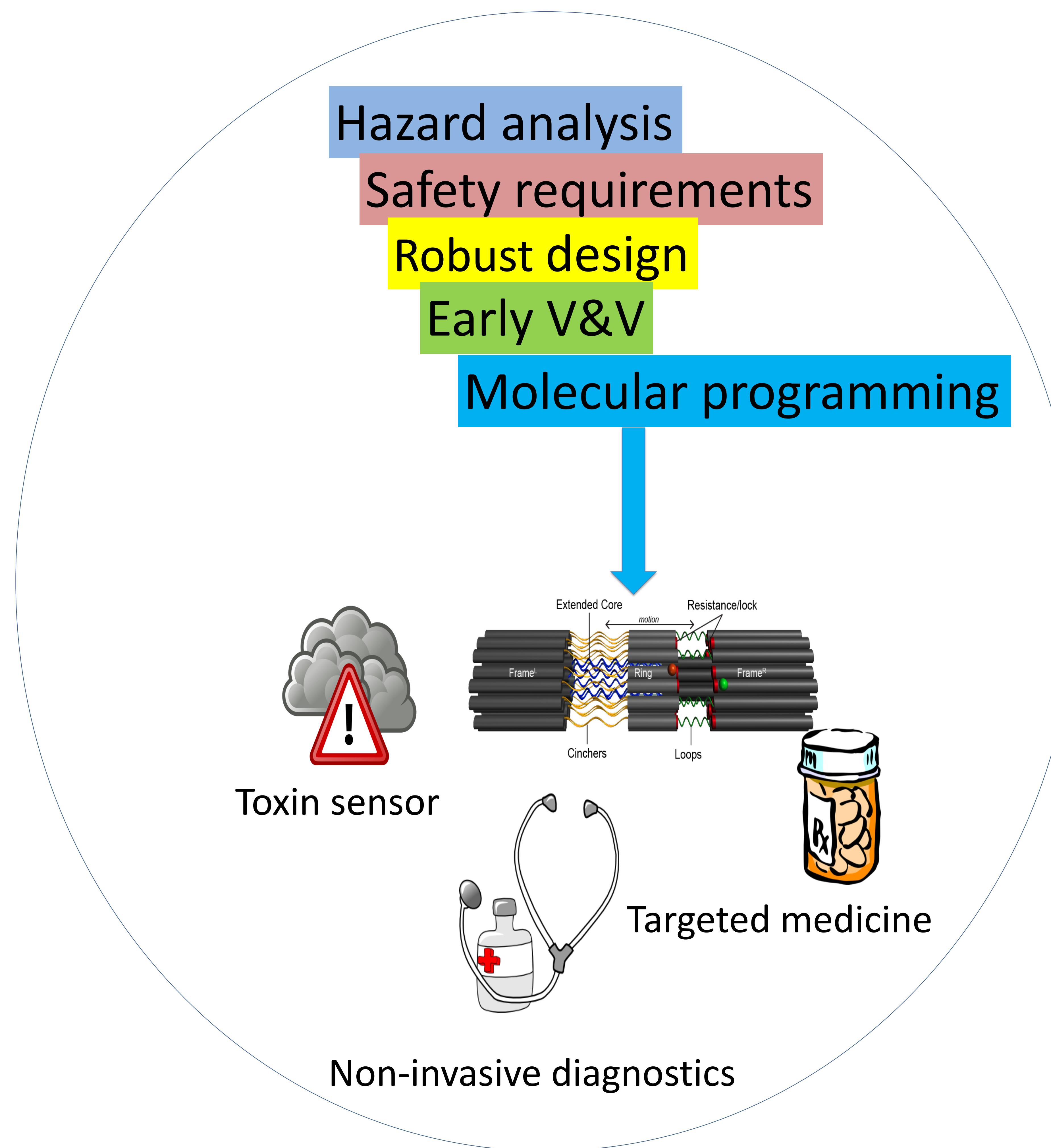
Award 1545028/Robyn R. Lutz (PI), Eric R. Henderson, James I. Lathrop, Jack H. Lutz, Iowa State University

Challenge:

Use new, automated modeling and analysis techniques to design **safer** cyber-molecular systems, where computation and control is done in DNA.

Solution:

- Multidisciplinary approach to design and analysis of safety-critical cyber-molecular systems.
- Designs essential molecular safety mechanisms, including watchdog timers, logging devices and programmable fault recovery.



Scientific Impact:

- Introduces chemical reaction networks that are provably robust to environmental and behavioral perturbations.
- Verifies designs at larger scale where current verification methods fail.

Broader Impact:

- *Project makes safety analysis of cyber-molecular designs practical.*
- Trained 10 PhD (3 faculty; 2 scientists; 1 postdoc; 4 current); 3 UG co-authors.
- College's public lecture was on project; 4 tutorials on project's new CPS methods.